

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of)	
)	
Expanding Flexible Use of the 3.7-4.2 GHz Band, et al.)	GN Docket No. 18-122
)	
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz)	GN Docket No. 17-183
)	(Inquiry Terminated as to 3.7-4.2 GHz)
)	
Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rules to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band)	RM-11791
)	
Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service)	RM-11778
)	

REPLY DECLARATION OF JEFFREY A. EISENACH, PH.D.

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I. Introduction

1. My name is Jeffrey A. Eisenach. I am a Managing Director at NERA Economic Consulting and Co-Chair of NERA's Communications, Media, and Internet Practice, and also serve on the firm's Board of Directors. I am also an Adjunct Professor at the Antonin Scalia Law School at George Mason University, where I teach Regulated Industries, and a Visiting Scholar at the American Enterprise Institute, where I focus on policies affecting the information technology sector. Previously, I served in senior policy positions at the U.S. Federal Trade Commission (FTC) and the White House Office of Management and Budget and taught at Harvard University's Kennedy School of Government and Virginia Polytechnic Institute and State University.
2. My practice focuses on the economic analysis of competition, intellectual property, regulatory, and consumer protection issues. I have submitted expert reports and testified in litigation matters in Federal and state court, as well as in regulatory proceedings before the U.S. Federal Communications Commission (FCC), the FTC, the U.S. Copyright Royalty Board, the U.S. International Trade Commission, several state public utility commissions, and courts and regulatory bodies in Australia, Canada, the Caribbean, the European Union, and South America. I have also testified before the U.S. Congress on multiple occasions. The focus of much of my work has been on assessing competition and innovation in mobile wireless markets. I have written numerous academic papers and expert reports on the economics of mobile wireless markets in general and on spectrum allocation and reallocation mechanisms in particular.
3. I am the author or co-author of several books and monographs, including *Broadband Competition in the Internet Ecosystem*, *The Digital Economy Fact Book*, and *The Telecom*

Revolution: An American Opportunity, and I have edited or co-edited five books, including *Communications Deregulation and FCC Reform: What Comes Next?* and *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace*. My articles have appeared in peer-reviewed journals such as *Communications and Strategies*, *Review of Network Economics*, and *Telecommunications Policy*, as well as in such popular outlets as *Forbes*, *Investor's Business Daily*, and the *Wall Street Journal*.

4. Before joining NERA, I was a managing director and principal at Navigant Economics. Before that, I served as Chairman of Empiris LLC, Criterion Economics LLC, and CapAnalysis, LLC. Among my other previous affiliations, I served as President and Senior Fellow at The Progress & Freedom Foundation and a scholar at the Heritage Foundation and the Hudson Institute. I received my Ph.D. in economics from the University of Virginia and my Bachelor of Arts in economics from Claremont McKenna College. Appendix A of this declaration contains my curriculum vitae.
5. I prepared this declaration at the request of the C-Band Alliance (CBA).¹ CBA asked that I review and offer my opinion on certain comments submitted in response to the Commission's Notice of Proposed Rulemaking (NPRM)² which raise concerns about the distribution of proceeds resulting from the reallocation of C-band spectrum from satellite (FSS) providers to mobile wireless operators. Specifically, several commenters question whether allowing current FSS operators to retain the proceeds from a market-based spectrum reallocation, as envisioned under CBA's Market-Based Approach, would offend the public interest by creating a "windfall"

¹ See The C-Band Alliance, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of the C-Band Alliance, GN Docket No. 18-122 et al. (October 29, 2018).

² Federal Communications Commission, *In the Matter of Expanding Flexible Use of the 3.7 to 4.2 GHz Band et al.*, Order and Notice of Proposed Rulemaking, GN Docket No. 18-122 et al. (July 13, 2018).

for the FSS operators.³ Their concerns take a variety of forms. Some seem to suggest that allowing the FSS operators to retain revenues from the reallocation is *per se* offensive to the public interest,⁴ while others imply that doing so would cause FSS operators' incentives to diverge from those of other participants (e.g., earth station operators) affected by the transition.⁵

6. In my opinion, such concerns are unfounded both as a matter of economics and as a matter of fact. As a matter of economics, a generation of economic research has demonstrated that secondary markets are superior to administrative process as a means of dynamically repurposing spectrum rights. Secondary markets work because, and only because, they provide powerful incentives for market participants to maximize the value of scarce resources – that is, because they incentivize spectrum licensees to repurpose or relinquish spectrum rights that can be put to a higher-valued use. The FCC has recognized the superiority of the market-based approach for spectrum reallocation in proceeding after proceeding, including in the recently concluded broadcast incentive auction. Indeed, CBA's Market-Based Approach is a direct

³ See generally, American Cable Association, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of the American Cable Association, GN Docket No. 18-122 *et al.* (October 29, 2018); Comcast Corporation and NBCUniversal Media, LLC, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of Comcast Corporation and NBCUniversal Media, LLC, GN Docket No. 18-122 *et al.* (October 29, 2018) (hereafter *Comcast Comments*); Dynamic Spectrum Alliance, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of Dynamic Spectrum Alliance, GN Docket No. 18-122 *et al.* (October 29, 2018) (hereafter *Comments of Dynamic Spectrum Alliance*); Public Interest Spectrum Coalition, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of the Public Interest Spectrum Coalition, GN Docket No. 18-122 *et al.* (October 29, 2018) (hereafter *Public Interest Spectrum Coalition Comments*).

⁴ See e.g., Google LLC, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al.*, Comments of Google LLC, GN Docket No. 18-122 *et al.* (October 29, 2018) at 11 (hereafter *Google Comments*) (“Unlike a Commission auction, moreover, revenues generated from private industry negotiations will not return funds to the U.S. Treasury. FSS incumbents, including non-U.S. operators that acquired their C-band rights from the Commission at no cost, would reap a financial windfall.”); *Comments of the Dynamic Spectrum Alliance* at 16 (“A private transaction facilitator...may...preferentially direct those billions of dollars to a small number of FSS operators and their shareholders.”).

⁵ See e.g., *Comcast Comments* at 26 (“[S]atellite operators stand poised to reap a substantial windfall, and their incentives will be far from aligned with the interests of downstream earth station operators and the consumers they serve when it comes to compensation for transition costs incurred....”).

outgrowth of the incentives created by the FCC’s secondary market policies and precedents, which led CBA’s members to believe that if they engage in the risky and disruptive process of fundamentally restructuring their businesses, they will be rewarded by sharing in the economic value thereby created. To prohibit or proscribe their ability to benefit economically from relinquishing their spectrum rights would not only result in a slower and less efficient reallocation of C-band spectrum; it would also create a precedent that would weaken incentives for market-based spectrum reallocation for the foreseeable future.

7. Concerns about windfalls are also unfounded as a matter of fact. While current C-band operators did not pay the government for their licenses, they did accept and fulfil license conditions of launching and maintaining multi-billion dollar C-band satellite fleets. Moreover, it is factually inaccurate to argue that the Market-Based Approach harms taxpayers.⁶ To the contrary, taxpayers will benefit in multiple ways, including from the availability of new high value services, enhanced economic performance, and higher tax revenues generated from the rapid reallocation of C-band spectrum to 5G mobile broadband. Similarly, concerns that the benefits of the transaction would flow to “foreign corporations” ignore the fact that the two largest members of the CBA – while domiciled outside the U.S. – are largely owned by Americans, collectively have more than half of their 3,400 global employees comprised of U.S. taxpayers, and have invested billions of dollars in American assets and infrastructure. Lastly, concerns that satellite operators will reap “monopoly profits” are also unfounded: CBA members do not have a monopoly on mid-band spectrum, nor does CBA have sufficient bargaining power to extract supracompetitive prices. Rather, any returns CBA members realize

⁶ *Google Comments* at 11 (“Unlike a Commission auction, moreover, revenues generated from private industry negotiations will not return funds to the U.S. Treasury.”).

will be a direct reflection of the economic value created by their entrepreneurial efforts to move scarce spectrum to a higher valued use.

8. The remainder of this declaration is organized into two main sections. Section II reviews the central pillars of the spectrum policy consensus around market-based reallocation of spectrum rights and the economic principles upon which they are founded; shows that CBA's Market-Based Approach to C-band reallocation fits squarely into that consensus; and, explains how departing from the market-based spectrum policy consensus would adversely affect the incentives of all spectrum market participants far into the future. Section III addresses specific concerns raised in connection with the so-called windfall issue, including benefits to U.S. taxpayers, foreign ownership, and "monopoly profits." Section IV presents a brief summary of my conclusions.

II. CBA's Proposal Fully Reflects the Economic Consensus on Spectrum Policy

9. Since publication of Ronald Coase's famous article in 1959,⁷ academics and policymakers have developed a firm consensus around the superiority of market-based mechanisms for the allocation and reallocation of spectrum.⁸ That consensus is based on fundamental economic principles, and has been fully embraced by both statute and Commission policy for many years. The CBA's proposal is not only fully consistent with the economics-based spectrum policy consensus but, in an important sense, is a result of it.

⁷ See R.H. Coase, "The Federal Communications Commission," *Journal of Law and Economics* 2 (October 1959). As Coase acknowledged, some of his conclusions were anticipated in a 1951 law review article by Leo Herzel. See Leo Herzel, "'Public Interest' and the Market in Color Television Regulation," *University of Chicago Law Review* 18 (1951).

⁸ See generally, Jeffrey A. Eisenach, "Spectrum Reallocation and the National Broadband Plan," *Federal Communications Law Journal* 64;1 (December 2011) 88-135 at 90-99.

A. Economic Principles Support CBA's Proposal

10. Beginning with Coase, economists and other scholars have developed a rich academic literature documenting the costs and inefficiencies of the command-and-control approach to spectrum management⁹ and the feasibility and benefit of market-based alternatives.¹⁰ Their research demonstrated that administrative allocation mechanisms assign spectrum to inefficient uses,¹¹ slow innovation,¹² distort investment incentives,¹³ and create incentives for rentseeking.¹⁴
11. While spectrum reallocation is invariably a complex task (and certainly that is the case here), the economic principles underlying the use of secondary markets are straightforward. First, spectrum rights must be flexible, so that spectrum can be put to higher-valued use as markets and technologies evolve. Second, rights must be transferable, so that underutilized spectrum can be directed to the parties most able to use it efficiently. Third, market incentives must be allowed to function – that is, all market participants must face the full opportunity costs of

⁹ For a comprehensive critique of early spectrum allocation decisions, see John O. Robinson, *Spectrum Management Policy in the United States: An Historical Account*, Federal Communications Commission Office of Plans and Policy Working Paper Series, Working Paper No. 15 (April 1985); see also Martin Neil Bailly *et al.*, *In the Matter of Promoting Efficient Use of Spectrum Through Elimination of Barriers to the Development of Secondary Markets, Comments of 37 Concerned Economists*, WT Docket No. 00-230 (February 7, 2001) at 4, n. 2; Thomas W. Hazlett, “Optimal Abolition of FCC Spectrum Allocation,” *Journal of Economic Perspectives* 22;1 (Winter 2008) 103–128.

¹⁰ See e.g., Arthur S. De Vany *et al.*, “A Property System for Market Allocation of the Electromagnetic Spectrum: A Legal-Economic-Engineering Study,” *Stanford Law Review* 21;6 (1969) 1499-1561.

¹¹ See e.g., Peter Cramton, *In the Matter of Secondary Market Forum, Statement of Professor Peter Cramton*, Federal Communications Commission (May 31, 2000) at 16 (“[S]econdary markets are essential for the efficient and intensive use of spectrum. Secondary markets identify gains from trade that are unrealized by the primary market which in this case is the FCC spectrum auctions.”).

¹² See e.g., Jerry A. Hausman, “Valuing the Effect of Regulation on New Services in Telecommunications,” *Brookings Papers on Economic Activity: Microeconomics* (1997) 1-36.

¹³ See e.g., see J. Gregory Sidak and Daniel F. Spulber, *Deregulatory Takings and the Regulatory Contract: The Competitive Transformation of Network Industries in the United States* (Cambridge University Press, 1998).

¹⁴ Indeed, Coase's original work was inspired in part by press reports that the FCC license decisions were being made on the basis of political influence. See also Thomas W. Hazlett and Robert J. Michaels, “The Cost of Rent-Seeking: Evidence from Cellular Telephone License Lotteries,” *Southern Economic Journal* 59;3 (1993) 425-435 at 425, 431 (showing that rent-seeking resulted in the dissipation of as much as 94 percent of the potential economic rents from cellular license lotteries).

alternative uses and users. These are precisely the principles behind the CBA proposal, which would apply to C-band spectrum the same flexible licensing regime that has been applied to commercial mobile wireless services (CMRS), including allowing it to be repurposed for new technologies and uses and allowing FSS licensees to transfer usage rights to new licensees (so long as they are qualified) through commercial transactions in which FSS licensees face market-based economic incentives to relinquish their spectrum.¹⁵

12. Contrary to the arguments of commenters like the Public Interest Spectrum Alliance,¹⁶ proposals to deprive FSS operators of the full return on their spectrum rights through a forced sale or minimum clearing mandate would inevitably replace market incentives with administrative process, precipitating all of the delays and inefficiencies secondary markets are designed to avoid. First and foremost, there is a high likelihood that any mandated clearing target, determined by administrative process rather than the forces of supply and demand, would depart from the economically efficient quantity. Second, the Commission would be forced to grapple directly with all of the administrative, economic and technological challenges of managing the repurposing exercise itself. Such costs would be especially high in the case of the C-band spectrum, in part because each FSS licensee holds rights to use all 500 MHz of spectrum, meaning the Commission would have to mandate by regulation the terms under which licensees would be compelled to participate. More generally, clearing of C-band spectrum will be costly and complex due to the intensity of current use, the need to continue

¹⁵ See Douglas W. Webbink, "Radio Licenses and Frequency Spectrum Use Property Rights," *Communications and the Law* 9 (June 1987) 3-29 at 4 ("For individuals and companies to have private property rights, at least three conditions are necessary: (1) the individuals must have the right to exclusive use of the resource; (2) individuals must have the right to receive income from the use of that resource; and (3) individuals must be allowed to transfer voluntarily that right in whole or in part to others.").

¹⁶ See *Public Interest Spectrum Coalition Comments* at 26-27.

supporting a diverse array of services, the continuing need for full-band, full-arc functionality, and the challenges of avoiding interference between FSS services and mobile broadband. The CBA's efforts to address these complex issues through voluntary, private-sector solutions are precisely the sort of activity secondary markets are intended to incentivize. As Intelsat and Intel explained in their initial filing, "Although a complicated and potentially costly undertaking, these challenges are not insurmountable *if satellite operators are appropriately incentivized. Market incentives for satellite operators are key....*"¹⁷

13. These powerful incentives have continued to be at work, for example by incentivizing CBA members to undertake the entrepreneurial and innovative activities that have allowed them to nearly double the amount of usable mobile wireless spectrum to be made available, from 100 MHz to 180 MHz. As explained in CBA's reply comments:

[W]hen the C-Band Alliance recently announced that it intended to increase the amount of cleared spectrum to 200 MHz (i.e., 180 MHz for terrestrial 5G use plus a 20 MHz guard band), it was the result of months of hard work to further refine its analyses, with respect to both contracted capacity commitments and technical mitigation tools, including in-depth discussions with mobile equipment manufacturers. More specifically, the C-Band Alliance recently finished live, over-the-air testing at a member facility in Georgia using a 5G signal simulator and optimized band-pass filter prototypes that it commissioned. The results of those tests provided the foundation for the technical specifications listed in the Technical Annex submitted in the C-Band Alliance Comments.... In sum, the decision to increase the maximum amount of spectrum cleared to 200 MHz was the outgrowth of substantial efforts – including significant technical and capacity management analysis – by the C-Band Alliance and its members to free more spectrum for terrestrial 5G use.¹⁸

¹⁷ Intelsat License LLC and Intel Corporation, *In the Matter of Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz, Joint Comments of Intelsat License LLC and Intel Corporation*, GN Docket No. 17-183 (October 2, 2017) at 17 (emphasis added).

¹⁸ The C-Band Alliance, *In the Matter of Expanding Flexible Use of the 3.7-4.2 GHz Band et al., Reply Comments of the C-Band Alliance*, GN Docket No. 18-122 *et al.* (December 7, 2018) at 15-17.

14. Full compensation for FSS operators is also key to avoiding rentseeking, i.e., the use of government process to reallocate wealth among competing political constituencies.¹⁹ Indeed, the prevalence of rentseeking activities in license renewal proceedings – in which competing interest groups would pursue their objectives by attempting to prevent or delay the renewal of broadcast licenses – was acknowledged by both the Commission and Congress, leading first to reforms in license renewal proceedings and ultimately to the extension of license terms and strict statutory limits on the conditions under which license renewals could be denied.²⁰

B. The CBA’s Proposal Is Consistent with Existing Policy and Precedent

15. The superiority of secondary markets to the administrative process, and the recognition that they can only function effectively if economic incentives are permitted to operate, has been deeply embedded in U.S. spectrum policy for decades. The National Telecommunications and Information Administration (NTIA) embraced the use of market mechanisms for spectrum allocation as early as 1991, when it concluded:

NTIA believes that, for most purposes, a spectrum management system that provides users with both incentives and opportunities to use spectrum in ways that are economically efficient will produce greater benefits for society than a centrally planned, highly regulatory system that attempts a “top down” approach to managing spectrum use.... For most private-sector users, a choice mechanism suggests itself that could be much more efficient than the current system – the market.²¹

16. NTIA’s recommendations specifically included the use of market mechanisms for spectrum reallocation, including flexible rights and voluntary trading, leasing and sharing of spectrum

¹⁹ See George J. Stigler, “The Theory of Economic Regulation,” *The Bell Journal of Economics and Management Science* 2;1 (Spring 1971) 3-21; see generally Jeffrey A. Eisenach and Hal J. Singer, “Avoiding Rent-Seeking in Secondary Market Spectrum Transactions,” *Federal Communications Law Journal* 65;3 (2013) 261-296 (hereafter *Eisenach and Singer 2013*).

²⁰ For a complete discussion see Howard A. Shelanski and Peter W. Huber, “Administrative Creation of Property Rights to Radio Spectrum,” *Journal of Law and Economics* 41;S2 (October 1998) 581-609 at 585-590.

²¹ See National Telecommunications and Information Administration, *U.S. Spectrum Management Policy: Agenda for the Future* (1991) at 57 (hereafter *NTIA Report*) (available at <https://www.ntia.doc.gov/print/report/1998/us-spectrum-management-policy-agenda-future>).

among licensees,²² and also acknowledged that spectrum rights were already being traded in market transactions.²³

17. The Commission has firmly embraced the use of secondary markets as a preferred means of spectrum reallocation for nearly 20 years. For example, in its December 2000 *Spectrum Policy Statement*, the Commission concluded:

[T]he best way to realize the maximum benefits from the spectrum is to permit and promote the operation of market forces in determining how spectrum is used. A principal tenet of this market-based approach is that in order for competition to bring consumers the highest valued services in the most efficient manner, competing users of spectrum need flexibility to respond to market forces and demands.²⁴

18. Further, the Commission specifically embraced secondary markets for spectrum licenses, concluding that:

An effectively functioning system of secondary markets would encourage licensees to be more spectrum efficient by freely trading their rights to unused spectrum capacity, either leasing it temporarily, or on a longer-term basis, or selling their rights to unused frequencies.²⁵

19. Importantly for the current proceeding, the *Spectrum Policy Statement* explicitly acknowledged the importance of allowing spectrum licensees to benefit from efforts to

²² See *NTIA Report* at 72 (“If the proposals of Chapter 3 for greater user flexibility are adopted, a licensee would be able to provide a variety of services. However, in some cases it may not be economically efficient for a licensee to offer a particular service itself. Greater ability to ‘alienate,’ or transfer, the spectrum needed for that service would permit a user to ‘lease’ a portion of its spectrum authorization to another party that could put the spectrum to better use.”).

²³ *NTIA Report* at 57 (“Markets could apply to two types of transactions: transfers among users and transfers from the government to users. Many private-sector spectrum users already employ the market for their own commercial purposes, as witnessed by the brisk business in sales and transfers of cellular franchises, other land-mobile operations, and radio and television stations. Indeed, for these and many other of the most commercially valuable uses of spectrum, the predominant means of ‘acquiring’ spectrum is through market transfers of licenses. These are, in many respects, the economic equivalent of purchases and sales of spectrum use rights.”).

²⁴ Federal Communications Commission, *In the Matter of Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of Secondary Markets, Policy Statement*, (December 1, 2000) at ¶8 (hereafter *FCC Policy Statement 2000*).

²⁵ *FCC Policy Statement 2000* at ¶12. See also Jonathan E. Nuechterlein and Philip J. Weiser, *Digital Crossroads: Telecommunications Law and Policy in the Internet Age*, 2d (MIT Press, 2013) at 106-107 (“[F]rom a consumer-welfare perspective, granting spectrum incumbents an alleged ‘windfall’ – if that is the only quick way to free up the spectrum at issue for more efficient uses – is usually superior to letting the incumbents tie up that spectrum in perpetuity with the less efficient uses specified in their licenses.”).

economize on spectrum usage: “If a licensee *knows that it has an economic opportunity* by conserving and leasing rights to excess spectrum, it may make strong business sense to be more spectrum efficient.”²⁶

20. Based on these principles, the FCC has approved literally thousands of license transfers, the vast majority of them routinely, and often at prices that saw sellers realize substantial gains.²⁷ For example, when Verizon acquired AWS-1 spectrum from SpectrumCo (of which the majority shareholder was Comcast) in 2012 for \$3.6 billion, SpectrumCo realised a profit of more than \$1 billion.²⁸ In approving the transaction, the Commission specifically found that SpectrumCo was not in violation of its anti-trafficking rules,²⁹ and concluded the transaction served the public interest because it “result[ed] in an expeditious transfer of valuable spectrum into the hands of multiple national service operators that will put it to use in providing the latest generation mobile broadband services.”³⁰
21. Similarly, when Qualcomm’s mobile television service proved unprofitable, it was able to sell its underutilized spectrum to AT&T for \$1.93 billion in 2011,³¹ nearly triple what Qualcomm

²⁶ *FCC Policy Statement 2000* at ¶1 (emphasis added).

²⁷ See John W. Mayo and Scott Wallsten, “Enabling Efficient Wireless Communications: The Role of Secondary Spectrum Markets,” *Information Economics and Policy* 22;1 (2010) 61-72; see also *Eisenach and Singer 2013*.

²⁸ See Arlington Economics, “The FCC’s AWS Auction” (available at <https://arlingtoneconomics.com/case-studies/the-fccs-aws-auction/>).

²⁹ See Federal Communications Commission, *In the Matter of Applications of Cellco Partnership d/b/a Verizon Wireless and SpectrumCo LLC and Cox TMI, LLC, for Consent to Assign AWS-1 Licenses et al., Memorandum Opinion and Order and Declaratory Ruling*, WT Docket No. 12-4 *et al.* (August 23, 2012) at ¶¶44-46.

³⁰ *Id.* at ¶6.

³¹ Phil Goldstein, “FCC Approves AT&T’s \$1.93B Purchase of Qualcomm’s 700 MHz Spectrum,” *FierceWireless* (December 23, 2011) (available at <https://www.fiercewireless.com/wireless/fcc-approves-at-t-s-1-93b-purchase-qualcomm-s-700-mhz-spectrum>).

paid,³² yet the Commission’s Order approving the transaction makes no mention of concerns that Qualcomm was reaping a “windfall.”³³

22. In 2012, Congress specifically embraced the concept of market-based spectrum reallocation in passing Title VI of the Middle Class Tax Relief and Job Creation Act, commonly known as the Spectrum Act,³⁴ which gave the FCC statutory authority to conduct the 2016-2017 Incentive Auction. The Spectrum Act confirmed the principle that spectrum licensees should be compensated for voluntarily relinquishing their spectrum rights, but also insisted that government share in the proceeds. Unfortunately, the mechanism put in place to achieve those goals resulted in five years of administrative process before the auction took place, and the 84 MHz of spectrum ultimately reallocated to mobile broadband use will likely not be fully cleared until 2020, eight years after the law was passed.³⁵ As I explain below, the costs to consumers of the delay in moving the spectrum to a higher-valued use will almost certainly exceed the revenues received by the Treasury.

23. Still more recently, the Commission has addressed the “windfall” issue in the context of new flexible use licenses in bands above 24 GHz. For example, when it created new upper microwave flexible use service (UMFUS) licenses in the 28 GHz and 39 GHz bands, the Commission acknowledged that “awarding mobile rights to incumbent licensees could be viewed as a windfall to those licensees . . . [but] the benefits of expediting service and

³² Chris Ziegler, “Qualcomm Talking to AT&T, Other Carriers over MediaFLO Spectrum Sale?” *Engadget* (November 19, 2010) (available at <https://www.engadget.com/2010/11/18/qualcomm-talking-to-atandt-over-mediaflo-spectrum-sale/>).

³³ Federal Communications Commission, *In the Matter of Application of AT&T Inc. and Qualcomm Incorporated for Consent to Assign Licenses and Authorizations*, Order (WT Docket 11-18, December 22, 2011).

³⁴ 47 U.S.C. § 309(j)(8)(G).

³⁵ Federal Communications Commission, “Transition Schedule” (May 8, 2017) (available at <https://www.fcc.gov/about-fcc/fcc-initiatives/incentive-auctions/transition-schedule>).

facilitating the coordination of fixed and mobile service outweigh any potential disadvantages of granting mobile rights to incumbents.”³⁶ Many of those licenses have now been transferred to new owners, for example through Verizon’s acquisitions of 39 GHz licenses from XO Holdings³⁷ and 28 GHz, 29 GHz, 31 GHz, and 39 GHz licenses from Straight Path,³⁸ and AT&T’s 2018 acquisition of 24 GHz and 39 GHz licenses from FiberTower.³⁹

24. To summarize, the proposition originally put forward by Coase and others that licensees should be granted flexibility and faced with economic incentives to transfer spectrum rights to new higher-valued uses is now firmly established in U.S. spectrum policy. After decades of reform efforts, the U.S. has a functioning secondary market for spectrum.

C. Failure to Approve the CBA Proposal Would Reduce Incentives for Efficient Spectrum Use in the Future

25. The economic case for recognizing a property-like interest in spectrum extends beyond the incentives faced by buyers and sellers in a particular reallocation to the dynamic effects on incentives for all spectrum market participants, for at least two reasons.⁴⁰ First, spectrum

³⁶ Federal Communications Commission, *In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services et al, Report and Order and Further Notice of Proposed Rulemaking*, GN Docket No. 14-177 et al (July 14, 2016) at ¶187.

³⁷ Federal Communications Commission, *In the Matter of Application of Cello Partnership d/b/a Verizon Wireless and XO Holdings for Consent to Transfer Local Multipoint Distribution Service and 39 GHz Licenses, Memorandum Opinion and Order*, ULS File No. 0007765708 (November 29, 2017).

³⁸ Federal Communications Commission, *In the Matter of Application of Verizon Communications Inc. and Straight Path Communications, Inc. for Consent to Transfer Control of Local Multipoint Distribution Service, 39 GHz, Common Carrier Point-to-Point Microwave and 3650-3700 MHz Service Licenses, Memorandum Opinion and Order*, ULS File No. 0007783428 (July 2, 2018).

³⁹ Federal Communications Commission, *In the Matter of Application of AT&T Mobility Spectrum LLC and FiberTower Corporation for Consent to Transfer Control of 39 GHz Licenses, Memorandum Opinion and Order*, ULS File Nos. 0007652635 and 0007652637 (July 2, 2018).

⁴⁰ It is generally accepted that spectrum licenses in the U.S. convey “property-like” rights, including an expectation of renewal. See *NTIA Report* at 68 (“Indeed, some observers believe, and we agree, that ‘the present scheme is not radically different from a limited property rights scheme.’”) and at 68 (“FCC licenses granted today generally have these attributes to some extent. Licensees receive ‘exclusivity’ in terms of authorization to use specific frequencies and protection from harmful interference, to the extent specified in the license. Licensees can receive income from the use of the license. Finally, licensees have the de facto right to transfer a license as part of a sale of assets, even though FCC approval is required. From this perspective, despite the possibility of license revocation under certain circumstances and other regulatory constraints, current spectrum licenses have some of the attributes of

licensees effectively enter into a regulatory contract with the government under which they make investments, provide services and incur costs on the reasonable expectation that their licenses will be renewed. Certainly that has been the case with the FSS operators, who in the past decade have invested more than \$5.6 billion to provide services to North American customers.⁴¹ To expropriate some or all of their spectrum rights without full compensation would deprive them of returns on that investment, and effectively signal to other licensees now and in the future that any investments they make in reliance on an expectation of license renewal would be equally at risk.

26. Second, as noted above, the FSS licensees' belief in the government's commitment to secondary markets, including the right to be compensated for relinquishing spectrum, was central to their decision to come forward – entirely at their own initiative – with the CBA proposal. In this sense, the CBA proposal represents the culmination of decades of spectrum reform efforts, which have finally succeeded in aligning the economic interests of spectrum licensees with the public interest in the dynamic reallocation of spectrum. The CBA proposal represents an opportunity to validate that marketplace perception and thereby encourage similar efforts in the future. Conversely, a decision by the FCC to prevent FSS licensees from realizing an economic return on their spectrum would be a strong signal to other spectrum licensees that spectrum reallocation decisions in the U.S. are in reality still governed by politics and administrative process rather than by markets.

property.”) For a more complete discussion, see Jeffrey A. Eisenach, *The Equities and Economics of Property Interests in TV Spectrum Licenses*, Navigant Economics (2014) at 3-7 (hereafter *Eisenach 2014*).

⁴¹ I estimated North American capital expenditures by allocating global capital expenditures for each firm based on geographic revenue shares. SES reports 27% of 2008-2017 revenues originated in the U.S.; Intelsat reports 47% of 2008-2017 revenues originated in North America.

III. Criticisms of the CBA Proposal Are Factually Unfounded

27. In addition to challenging the general proposition of fully rewarding spectrum licensees for reallocating spectrum, some commenters seek to support their windfall arguments with specific assertions, including arguing that U.S. taxpayers will not benefit sufficiently from the CBA proposal, or that revenues accruing to the FSS licensees would represent “monopoly profits.” As I explain below, these assertions are factually incorrect.

A. Taxpayers Will Benefit from the CBA Proposal

28. Some commenters argue that taxpayers will not benefit sufficiently from the CBA proposal.⁴²

There are two fundamental problems with this argument. First, taxpayers are also consumers, and the benefit to consumers of rapid and efficient repurposing of C-band spectrum will far exceed any additional government revenues that might be generated – at some uncertain point in the future – by administrative reallocation. Second, the Treasury will accrue substantial additional revenues, both directly and indirectly, from the economic growth generated by rapid and efficient C-band repurposing.

29. First, it is extremely likely that the consumer welfare gains from rapid allocation of C-band spectrum to mobile broadband carriers made possible by the CBA proposal will far exceed any government revenues that might be generated by a more administrative process. For example, a study by Hazlett and Munoz estimates the consumer welfare effects of the release of CMRS spectrum in the U.S. They find that the *annual* increase in consumer surplus is approximately equal to the total amount paid by the purchasers.⁴³ They also note that the social welfare benefit

⁴² See e.g., *Dynamic Spectrum Alliance Comments* at 16; *Google Comments* at 11.

⁴³ Thomas W. Hazlett and Roberto E. Muñoz, “A Welfare Analysis of Spectrum Allocation Policies,” *RAND Journal of Economics* 40:3 (2009) 424-454. See also Gregory L. Rosston, “The Long and Winding Road: The FCC Paves the Path with Good Intentions,” *Telecommunications Policy* 27 (2003) 501-515 at 513 (“The consumer surplus increase may be ten times as high as the private value so that trying to capture some of the windfall gain through

of auction revenues that accrue to the Treasury is not equal to the full amount of the revenues, but rather to the economic welfare cost of alternative revenue raising measures, which is about 33 cents per dollar of federal revenue. Thus, for example, if government raises \$15 billion from auctioning spectrum, economic welfare experiences a one-time increase of \$5 billion (the welfare loss that would have resulted from raising \$15 billion through taxes), but for every year of delay (relative to a secondary market approach), consumer welfare *is reduced* by \$15 billion. The break-even point is four months: That is, consumers (and taxpayers) are better off adopting a market-oriented approach over an administrative approach that returns all revenues to the Treasury if the market-oriented approach is just four months faster.⁴⁴

30. Second, the increased economic activity associated with more rapid repurposing of C-band spectrum will benefit the U.S. Treasury as well as increasing consumer welfare. For example, one recent study estimates that next generation wireless networks will add \$2.7 trillion to U.S. GDP by 2030, roughly equivalent to increasing annual GDP growth by 0.7 percentage points.⁴⁵ Assuming an average overall Federal tax rate of about 20 percent of GDP, that translates into incremental tax revenues of approximately \$540 billion. By accelerating the realization of

withholding or delaying liberalization rights could be very costly.... As a result, while increasing the tax revenues by a small amount, restricting liberalization to increase tax revenues would reduce overall welfare significantly.”)

⁴⁴ Even this example is conservative in that it assumes the government would retain 100 percent of revenues received for mobile broadband licenses, rather than splitting the revenues with FSS licensees and paying relocation costs. Of the \$19.3 billion raised in the broadcast incentive auction, broadcasters received \$10.05 billion in auction revenues plus an additional \$1.75 billion in reimbursements for relocation expenses, or about 61 percent of total proceeds. The NPRM in that matter was approved by the Commission on September 28, 2012; the auction was completed in April 2017. Repurposing is still in progress and is expected to be complete sometime in 2020.

⁴⁵ Michael Mandel, *Long-Term U.S. Productivity Growth and Mobile Broadband: The Road Ahead*, Progressive Policy Institute (March 2016) at 1-2 (available at http://www.progressivepolicy.org/wp-content/uploads/2016/03/2016.03-Mandel_Long-term-US-Productivity-Growth-and-Mobile-Broadband_The-Road-Ahead.pdf). See also Frost & Sullivan and Principal, *5G: The Foundation for a Hyper-Connected World* (February 1, 2018) at 9 (available at <https://www.principalglobal.com/documentdownload/79918>) (noting that “[c]ountries and cities that are quicker to adopt 5G technology will benefit from larger gains in productivity output through higher utilization of assets.”).

those revenues, the CBA proposal is very likely to increase rather than decrease net Federal tax receipts compared with slower, more bureaucratic alternatives.

31. Further, the fact that the FSS licensees are domiciled outside the U.S.⁴⁶ is simply not relevant to the public interest inquiry in this matter. Substantial proportions of the two largest CBA members are owned by U.S. investors,⁴⁷ and collectively more than half of their 3,400 global employees are U.S. taxpayers. Additionally, as noted above, CBA member companies have made substantial investments in infrastructure to serve U.S. customers: Intelsat and SES have been launching satellites and building ground systems in the U.S. for more than 50 years in the case of Intelsat and more than 40 years in the case of SES. The going-forward benefits of the CBA proposal are also likely to accrue largely to U.S. workers in the form of jobs associated, for example, with the construction and launch of new satellites required to effectuate the clearing of C-band spectrum.

B. Proceeds from the CBA Proposal Do Not Represent “Monopoly Profits”

32. The FSS licensees are not in a position to extract “monopoly profits” from the CBA proposal.

To begin, the FSS licensees do not have a monopoly on mid-band spectrum. More than 700 MHz of mid-band spectrum is already in private hands,⁴⁸ and the Commission is in the process of making substantial additional mid-band spectrum available in the 3.5 GHz band, a fact which Comcast acknowledges is already affecting the demand for mid-band spectrum.⁴⁹

⁴⁶ See e.g., *Google Comments* at 11.

⁴⁷ Intelsat reports that U.S. investors hold the vast majority of its publicly-traded securities, while SES reports that more than half of its stock is owned by North American investors.

⁴⁸ See e.g., Coleman Bazelon and Giulia McHenry, “Mobile Broadband Spectrum: A Vital Resource for the U.S. Economy” (May 11, 2015) at Table 2 (available at <https://ecfsapi.fcc.gov/file/60001117200.pdf>). Bazelon and McHenry report a total of 200 MHz of mid-band spectrum is in the pipeline for release over the next few years.

⁴⁹ *Comcast Comments* at 30 (“[T]he Commission is well on its way to making available significant amounts of high- and mid-band spectrum for 5G in the near future. This includes the 3.5 GHz Band, the rules for which the Commission very recently updated to facilitate 5G deployments. Just the initiation of this inquiry has likely had the effect of depressing demand for 3.5 GHz spectrum.”).

CBA's bargaining power is also constrained by the fact that potential buyers have other alternatives, including repurposing existing spectrum holdings, and by the uncertainties inherent in delay. In bargaining terms, CBA's "best alternative to a negotiated agreement" is fraught with risk.

33. Nor is it relevant that the C-band licensees did not directly pay for their licenses at the time of issuance.⁵⁰ As noted above, the C-Band licensees have invested billions of dollars in launching and maintaining their satellite fleets, fulfilling the regulatory bargain inherent in the issuance of their licenses. Further, as an economic matter, past payments for spectrum rights are sunk costs, which do not affect licensees' incentives to participate in secondary markets. Hence, the FCC traditionally has not conditioned spectrum rights on whether licensees originally paid for their license rights. For example, the original CMRS licenses were either awarded to incumbent landline companies (the "B Block") or distributed to new entrants through comparative hearings or a lottery (the "A Block"). In neither case did the licensees pay. Yet such licenses have been accorded the full range of spectrum rights associated with CMRS spectrum, including flexibility and alienability, and have been bought and sold in multiple transactions.⁵¹

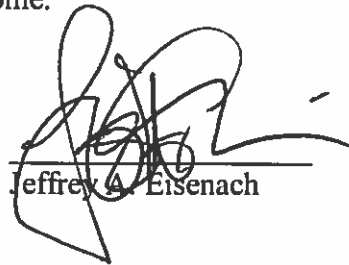
IV. Conclusion

34. The transition from administrative allocation and reallocation of spectrum rights to a market-based approach can be dated to the publication of Coase's article, "The Federal Communications Commission," in 1959. The CBA proposal represents the natural

⁵⁰ See e.g., *Google Comments* at 11.

⁵¹ See *Eisenach 2014* at 14-15. DBS licenses, which were also awarded through administrative allocation, have also been bought and sold for substantial sums. See *ibid.* at 15 and n. 50. See also *NTIA Report* at 66 ("When a cellular license is transferred, for example, the purchaser is paying often a substantial amount for the right to compete against an incumbent provider that has acquired spectrum for 'free' -- namely, the 'wireline' licensee, which is owned by the local telephone company.").

culmination of that process, a demonstration that the concept of secondary markets is now sufficiently ingrained in the perceptions of market participants to elicit an innovative and entrepreneurial proposal from incumbent spectrum holders. As an economic matter, CBA's Market-Based Approach represents the payoff to six decades of spectrum policy reform; by allowing it to go forward, the Commission can assure that the U.S. continues experiencing the benefits of dynamic spectrum markets for decades to come.



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Dr. Eisenach's consulting practice focuses on economic analysis of competition, regulatory, intellectual property and consumer protection issues. He has submitted expert reports and testified in US federal court as well before the Antitrust Division of the U.S. Department of Justice, the Federal Trade Commission, the Copyright Royalty Board, the Federal Communications Commission, the International Trade Commission, US Tax Court, several state public utility commissions, and courts and regulatory bodies in Australia, Canada, the United Kingdom, the Caribbean, and South America. He has also advised clients in some of the world's largest information technology sector mergers.

He has written or edited 19 books and monographs, including *Broadband Competition in the Internet Ecosystem* and *Competition, Innovation and the Microsoft Monopoly: Antitrust in the Digital Marketplace*. His writings have also appeared in scholarly journals such as *The Review of Network Economics*, as well as in popular outlets like *Forbes*, *The New York Times*, and *The Wall Street Journal*.

Prior to joining NERA, Dr. Eisenach was a managing director and principal at Navigant Economics, and before that he served as Chairman of Empiris LLC, Criterion Economics, and CapAnalysis, LLC. Among his other previous affiliations, Dr. Eisenach has served as President and Senior Fellow at The Progress & Freedom Foundation; as a scholar the Heritage Foundation, and the Hudson Institute; as a member of the 1980-81 Reagan-Bush Transition Team on the Federal Trade Commission, the 2000-2001 Bush-Cheney Transition Team on the Federal Communications Commission, the Virginia Governor's Commission on E-Communities, and the Virginia Attorney General's Task Force on Identity Theft. In 2016-2017 he led the Trump-Pence Transition Team for the Federal Communications Commission.

Dr. Eisenach received his PhD in economics from the University of Virginia and his BA in economics from Claremont McKenna College.

Education

1985	Ph.D. in Economics, University of Virginia
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Professional Experience

Jan 2014-present	Managing Director/Senior Vice President NERA Economic Consulting
Jan 2010-Jan 2014	Managing Director and Principal, Navigant Economics
Sept 2008-Jan 2010	Chairman and Managing Partner, Empiris LLC
June 2006-Sept 2008	Chairman, Criterion Economics, LLC
July 2005-May 2006	Chairman, The CapAnalysis Group, LLC
Feb 2003-July 2005	Executive Vice Chairman, The CapAnalysis Group, LLC
June 1993-Jan 2003	President, The Progress & Freedom Foundation
July 1991-May 1993	Executive Director, GOPAC
Mar 1988-June 1991	President, Washington Policy Group, Inc.
Sept 1986-Feb 1988	Director of Research, Pete du Pont for President, Inc.
1985-1986	Executive Assistant to the Director, Office of Management and Budget
1984-1985	Special Advisor for Economic Policy and Operations, Office of the Chairman, Federal Trade Commission
1983-1984	Economist, Bureau of Economics, Federal Trade Commission
1981	Special Assistant to James C. Miller III, Office of Management and Budget/Presidential Task Force on Regulatory Relief
1979-1981	Research Associate, American Enterprise Institute
1980	Consultant, Economic Impact Analysts, Inc.
1978	Research Assistant, Potomac International Corporation

Teaching Experience

2000-present	Adjunct Professor, George Mason University School of Law, (Courses Taught: Regulated Industries; Perspectives on Government Regulation; The Law and Economics of the Digital Revolution)
1995-1999	Adjunct Lecturer, Harvard University, John F. Kennedy School of Government, (Course Taught: The Role of Government in the 21st Century)
1989	Adjunct Professor, George Mason University, (Course Taught: Principles of Economics)

1985, 1988	Adjunct Professor, Virginia Polytechnic Institute and State University, (Courses Taught: Graduate Industrial Organization, Principles of Economics)
1983-1984	Instructor, University of Virginia, (Courses Taught: Value Theory, Antitrust Policy)
1982-1983	Teaching Assistant, University of Virginia, (Courses Taught: Graduate Microeconomics, Undergraduate Macroeconomics)

Honors & Professional Activities

2018-present	Member, Board of Directors, NERA Economic Consulting
2016-2017	Leader, Trump-Pence Presidential Transition Team on the Federal Communications Commission
2012-present	Visiting Scholar, American Enterprise Institute
2011-present	Member, Board of Directors, Information Technology & Innovation Foundation
2011-2018	Member of the Board of Directors, Economic Club of Washington (Vice President for Education, 2012-2017)
2010-2011	Member, World Bank ICT Broadband Strategies Toolkit Advisory Group
2009-present	Member, Economic Club of Washington
2008-2009	Member, Board of Directors, PowerGrid Communications
2008-2012	Member, Board of Advisors, Washington Mutual Investors Fund
2002-2014	Member, Board of Advisors, Pew Project on the Internet and American Life
1993-2009	Member, Board of Directors, The Progress & Freedom Foundation
2002	Member, Attorney General's Identity Theft Task Force, Virginia
2002-2003	Member of the Board of Directors, Privacilla.com
2001-2004	Member, Executive Board of Advisors, George Mason University Tech Center
2001-2002	Contributing Editor, <i>American Spectator</i>
2001	Member, Transition Advisory Committee on the FCC
2000-2001	Member, Governor's Task Force on E-Communities, State of Virginia
1999-2001	Member, 2000-2001 Networked Economy Summit Advisory Committee
1998-2003	Member, Board of Directors, Internet Education Foundation
1998-2003	Member, Internet Caucus Advisory Committee
1996-2002	Member, American Assembly Leadership Advisory Committee
1995-2000	Member, Commission on America's National Interests

1988-1991	Adjunct Scholar, Hudson Institute
1988-1991	Visiting Fellow, Heritage Foundation
1981-1984	President's Fellowship, University of Virginia
1981-1983	Earhart Foundation Fellowship, University of Virginia
1981	Member, Presidential Transition Team on the Federal Trade Commission
1979	Henry Salvatori Award, Claremont Men's College
1978	Frank W. Taussig Award, Omicron Delta Epsilon

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In the Matter of the Constitution of the Co-Operative Republic of Guyana and In the Matter of the application for redress under Article 153 for the contravention of the Applicant's fundamental rights guaranteed by Articles 20, 146, and 149D of the Constitution of the Republic of Guyana and In the Matter of the Telecommunications Act No. 27 of 1990, U-Mobile (Cellular) Inc., v. The Attorney General of Guyana, Expert Report on Behalf of Guyana Telephone and Telegraph Company (June 19, 2008)

In the Matter of Bright House Networks LLC et al v. Verizon California et al, Federal Communications Commission File No. EB-08-MD-002, Expert Declaration on Behalf of Verizon Communications (February 29, 2008)

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